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Bureau Steam Engineering, Navy Department, Washington, D. C.
Bryan, J. I., 1st Assistant Engineer, U. S. R. C. S.,
U. S. S. *Mohawk*, Tompkinsville, Staten Island, New York, N. Y.
Bulmer, Roscoe C., Lieutenant Commander, U. S. N.
Burke, W. S., Passed Assistant Engineer, U. S. N. (retired),
60 Buckingham street, Cambridge, Mass.
Bush, W. W., Lieutenant Commander, U. S. N.
Butler, H. V., Lieutenant, U. S. N.

Cage, H. K., Lieutenant, U. S. N.
Cairnes, Geo. W., 2d Assistant Engineer, U. S. R. C. S.....U. S. S. *Algonquin*, San Juan, P. R.
Capps, W. L., Rear Admiral, Chief Constructor, U. S. N., Navy Department, Washington, D. C.
Carr, C. A., Commander, U. S. N.
Carney, R. E. Assistant Engineer, U. S. N. (retired).
Carter, T. F., Commander, U. S. N.
Castle, Guy W. S., Lieutenant, U. S. N.
Cathcart, W. L......Hoyt, Montgomery County, Pa.
Chambers, W. H, Commander, U. S. N. (retired),
Chandler, Lloyd H., Lieutenant Commander, U. S. N.
Chappell, R. H......Bureau Engraving and Printing, Washington, D. C.
Clark, T. W......Care Standard Oil Co. of New York, 4 Des Voeux Road, Hong Kong, China.
Cluverius, W. T., Lieutenant, U. S. N.
Cole, W. C., Lieutenant Commander, U. S. N.
Collins, Henry L......850 Ridge avenue, Allegheny, Pa.
Cone, Hutch I., Lieutenant Commander, U. S. N.
Connelly, Louis J., Lieutenant, U. S. N.
Cook, Allen M., Lieutenant Commander, U. S. N.
Cooley, Mortimer E., Professor Mechanical Engineering,
University of Michigan, Ann Arbor, Mich.
Cooper, I. T., Lieutenant, U. S. N. (retired).....Camden, Del.
Cothran, W. B., Warrant Machinist, U. S. N.
Cowles, W. Barnum, Constructing Engineer.....Cor. Lake and Wason streets, Cleveland, Ohio.
Cox, Leonard M., Chief Engineer, L. H. & St. L. Ry. Co.....Louisville, Ky.
Coxe, W. G......Harlan-Hollingsworth Corporation, Wilmington, Del.
Crank, R. K., Lieutenant Commander, U. S. N.

Crawford, Robt., Passed Assistant Engineer, U. S. N. (retired),
Wm. Cramp and Sons, Beach and Ball streets, Philadelphia, Pa.
Creighton, W. H. P., Assistant Engineer, U. S. N. (retired),
1438 Henry Clay Avenue, New Orleans, La.
Crenshaw, A., Lieutenant, U. S. N.
Cronan, W. P., Lieutenant, U. S. N.
Cunningham, A. C., Civil Engineer, U. S. N.....Navy Yard, Norfolk, Va.
Curtis, C. J., 2d Assistant Engineer, U. S. R. C. S.....U. S. S. *Windom*, Galveston, Texas.

Dampman, Paul E., Ensign, U. S. N.
Danforth, Geo. W., Lieutenant, U. S. N. (retired).....Charleston, Missouri.
Davis, Cleland, Lieutenant Commander, U. S. N.
Davis, E. W., Engineer, U. S. R. C. S.....U. S. S. *Arcata*, Post Townsend, Wash.
Davis, Norris K.....S. W. corner 7th and Harrison sts., San Francisco, Cal.
Davison, G. C.....Electric Boat Co., Quincy, Mass.
DeLany, E. H., Lieutenant, U. S. N.
Denig, R. G., Commander, U. S. N.
Densmore, C. W., Lieutenant, U. S. N.
Dick, Thomas M., Lieutenant, U. S. N. (retired).....180 Hawthorne street, Brooklyn, N. Y.
Diman, W. G., Lieutenant, U. S. N.
Dinger, Henry C., Lieutenant, U. S. N.
Dixon, A. F., Captain, U. S. N.....Navy Department, Washington, D. C.
Dunlap, T. C.....651 Franklin avenue, Columbus, Ohio.

Eaton, Wm. C., Captain, U. S. N.....P. O. Building, Brooklyn, N. Y.
Eckart, W. R., Mechanical Engineer.....3014 Clay street, San Francisco, Cal.
Edgar, W. A., Lieutenant Commander, U. S. N.
Edson, Jarvis B., Mechanical Engineer.....313 W. 74th street, New York, N Y.
Edwards, W. D., Mechanical Engineer.....818 Court Avenue, Memphis, Tenn.
Eldridge, F. H., Commander, U. S. N.,
Care Naval Examining Board, Mills Building, Washington, D. C.
Elfers, George, Engineer, U. S. R. C. S.....U. S. S. *Mackinac*, Sault Ste. Marie, Mich.
Elson, H. J.....5800 Von Versen Avenue, St. Louis, Mo.
Engard, A. C., Chief Engineer, U. S. N. (retired).....2131 N. 19th street, Philadelphia, Pa.
Evans, H. A., Naval Constructor, U. S. N.....Navy Yard, Mare Island, Cal.
Evans, H. H.....453 Washington Boulevard, Chicago, Ill.

Farley, L. C., Ensign, U. S. N.
Farmer, Edward, Chief Engineer, U. S. N. (retired).....274 Newberry street, Boston, Mass.
Fenton, Theo. C., Commander, U. S. N. (retired).
Ferguson, Geo. R., Assistant Engineer, Department of Bridges, 21 Park Row, New York, N. Y.
Ferguson, H. L.....Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Fitch, Edwin O., Jr., Ensign, U. S. N.
Fitch, H. W., Chief Engineer, U. S. N. (retired).....1734 K street, N. W., Washington, D. C.
Fitzgerald, E. T., Lieutenant, U. S. N.
Ford, Jno. D., Rear Admiral, U. S. N. (retired).....2319 Maryland avenue, Baltimore, Md.
Freeman, F. N., Lieutenant, U. S. N.
French, D. McC., Chief Engineer, U. S. R. C. Division.....U. S. S. *Morrill*, Detroit, Mich.
Fry, Alfred Brooks, U. S. Treasury Service, Lieutenant Commander, Naval Brigade, S. N. Y.,
Post Office Building, New York, N. Y.

Galt, Robert W., Chief Engineer, U. S. N. (retired).....Williamsburg, Va.
Gardiner, C. A., Lieutenant, U. S. N.
George, H., Lieutenant Commander, U. S. N.
Gillis, I. V., Lieutenant Commander, U. S. N.
Gilmer, J. B., Lieutenant, U. S. N.
Gow, J. L., Commander, U. S. N.....Fore River Shipbuilding Co., Quincy, Mass.

Graham, A. T., Lieutenant, U. S. N.
Green, C. M., Chief Engineer, U. S. R. C. S., Room 77, Appraisers' Building, San Francisco, Cal.
Greene, Levi R., 35 Concord avenue, Cambridge, Mass.
Griffin, R. S., Commander, U. S. N., 2003 Kalorama avenue, N. W., Washington, D. C.
Gsantner, O. C., First Assistant Examiner, U. S. Patent Office;
Residence, 1708 New Jersey avenue, Washington, D. C.

Hall, H., Commander, U. S. N.
Hall, R. T., Commander, U. S. N., Navy Yard, New York.
Halligan, John, Jr., Lieutenant, U. S. N.
Halstead, A. S., Lieutenant Commander, U. S. N.
Hanrahan, D. C., Lieutenant, U. S. N.
Hart, B. Franklin, 143 Liberty street, New York, N. Y.
Hartrath, Armin, 120 Liberty street, New York, N. Y.
Hasbrouck, R. D., Lieutenant Commander, U. S. N.
Hayes, Charles H., Lieutenant Commander, U. S. N.
Henderson, Richard, Captain, U. S. N. (retired), Salisbury, N. C.
Henderson, Robert, Lieutenant, U. S. N.
Hepburn, W. M., 2d Assistant Engineer, U. S. R. C. S.,
1124 East Capitol street, Washington, D. C.
Herbert, W. C., Lieutenant Commander, U. S. N.
Hibbs, F. W., Care of Moran Bros., Seattle, Washington.
Higgins, R. B., Lieutenant Commander, U. S. N.
Hollis, Ira N., Professor of Engineering, Harvard University, Cambridge, Mass.
Holmes, U. T., Lieutenant Commander, U. S. N.
Hunt, A. M., Consulting Engineer, 202 California street, San Francisco, Cal.

Inch, Richard, Rear Admiral, U. S. N., 303 A street, S. E., Washington, D. C.

Jenson, H. N., Lieutenant, U. S. N.
Johnson, A. W., Lieutenant, U. S. N.
Jones, Horace W., Commander, U. S. N. (retired).

Kaemmerling, Gustav, Commander, U. S. N., Beacon Building, 6 Beacon street, Boston, Mass.
Kaiser, Louis A., Lieutenant Commander, U. S. N.
Keilholtz, Pierre O., Chief Engineer, City and Suburban Railway Co., Baltimore, Md.
Kellogg, Edw. S., Lieutenant Commander, U. S. N.
Kibbee, A. S., Ensign, U. S. N.
King, W. R., Passed Assistant Engineer, U. S. N. (retired),
President Baltimore Polytechnic Institute, 29 Mt. Royal avenue, Baltimore, Md.
Kinkaid, T. W., Commander, U. S. N., Post Office Building, Chester, Pa.
Kirby, Absalom, Chief Engineer, U. S. N. (retired), 405 Seward Square, Washington, D. C
Koester, O. W., Lieutenant Commander, U. S. N.
Kohler, Geo. M., U. S. R. C. S.,
Revenue Marine Division, Treasury Department, Washington, D. C.
Kotzschmar, Herman, Jr., Chief Engineer, U. S. R. C. S.,
Division, Revenue Cutter Service, Treasury Department, Washington, D. C.
Kutz, George F., Chief Engineer, U. S. N. (retired), 1232 Madison street, Oakland, Cal.

Lawton, S. H., Jr., Midshipman, U. S. N.
Leavitt, E. D., Mechanical Engineer, 33 Garden street, Cambridge, Mass.
Leiper, C. L., 1223 Potter street, Chester, Pa.
Leonard, J. C., Lieutenant Commander, U. S. N.
Leopold, H. G., Commander, U. S. N. (retired).
Lincoln, G. S., Lieutenant, U. S. N.
Linnard, Joseph H., Naval Constructor, U. S. N., Navy Department, Washington, D. C.

Little, W. N., Commander, U. S. N.,
Union League Club, Corner Bedford avenue and Dean street, Brooklyn, N. Y.
Livermore, C. W., Assistant Engineer, U. S. N. (retired).....P. O. Box 376, Pasadena, Ca.
Loyd, John.....558-562 Water street, New York, N. Y.
Lowe, John, Rear Admiral, U. S. N. (retired).....Lowecroft, Noroton, Conn
Luby, John McC., Lieutenant, U. S. N.

McAllister, Charles A., Engineer-in-Chief, U. S. R. C. S.
McAlpine, K., Lieutenant Commander, U. S. N.
McCully, Newton A., Lieutenant Commander, U. S. N.
McElmell, Jackson, Chief Engineer, U. S. N. (retired)...1931 Spring Garden st., Philadelphia, Pa.
McElroy, G. W., Commander, U. S. N.
McFarland, W. M., Acting Vice President,
Westinghouse Electric and Manufacturing Co., P. O. Box 911, Pittsburg, Pa.
McKay, G. A., Civil Engineer, U. S. N.
McKean, Fred G., Chief Engineer, U. S. N. (retired),
1220 New Hampshire avenue, N. W., Washington, D. C.
McKean, J. S., Lieutenant Commander, U. S. N.
McLean, Ridley, Lieutenant Commander, U. S. N.
McMorris, B. K.....Wetumpka, Ala.
Maccoun, W. E., Chief Engineer, U. S. R. C. S.....U. S. R. S. *Manning*, Honolulu, H. I.
Macomb, D. B., Chief Engineer, U. S. N. (retired),
183d street, University Heights, New York, N. Y.
Magee, E. A., Chief Engineer, U. S. N. (retired).....187 Marcy avenue, Brooklyn, N. Y.
Magee, Geo. W., Chief Engineer, U. S. N. (retired).....187 Marcy avenue, Brooklyn, N. Y.
Mahony, D. S., Lieutenant, U. S. N.
Mallory, C. K., Lieutenant, U. S. N. (retired).....The Solway Process Co., Syracuse, N. Y.
Manning, Chas. H., Passed Assistant Engineer, U. S. N. (retired),
General Superintendent Amoskeag Manufacturing Co., Manchester, N. H.
Mansfield, Newton, Lieutenant Commander, U. S. N.
Martin, F. C., Lieutenant, U. S. N.
Mathews, C. H., Commander, U. S. N. (retired).
Mattice, A. M., Works Manager, Walworth Mfg. Co.....South Boston, Mass.
Maxwell, W. J., Lieutenant Commander, U. S. N.
Meyers, Arthur C., Midshipman, U. S. N.
Mickley, A. J., Engineer's Office, Department of Docks and Ferries,
Ferry Terminal, St. George, S. I., New York, N. Y.
Miller, W. S., Lieutenant, U. S. N.
Milligan, R. W., Rear Admiral, U. S. N. (retired).....10 Raleigh Square, Norfolk, Va.
Moody, Roscoe C., Lieutenant Commander, U. S. N.
Morgan, Leo, Mechanical Engineer.....642 B street, San Francisco, Cal.
Moritz, Albert, Commander, U. S. N. (retired).....153 East 73d street, New York, N. Y.
Morrison, F., Lieutenant, U. S. N.
Moses, C. C., Ensign, U. S. N.
Moses, S. E., Lieutenant Commander, U. S. N.
Munroe, C. W., Chief Engineer, U. S. R. C. S.,
U. S. S. *Winnisimmet*, Long Wharf, Boston, Mass.
Myers, Wm. C., U. S. R. C. S.....U. S. S. *Denter*, New London, Conn.

Nails, F. R., Lieutenant, U. S. N.
Norris, A., Ensign, U. S. N.
Norris, William, Lieutenant, U. S. N.
Norton, H. P., Commander, U. S. N.,
Bureau Steam Engineering, Navy Department, Washington, D. C.
Nulton, Louis [illegible], Lieutenant Commander, U. S. N.
Nutting, D. C., Naval Constructor, U. S. N.,
Bureau Construction and Repair, Navy Department, Washington, D. C.

Offley, C. N., Lieutenant Commander, U. S. N.
Osburn, Franklin W., Lieutenant, U. S. N.

Palmer, J. E., Commander, U. S. N. (retired).
Parks, W. M., Commander, U. S. N.,
Bureau Steam Engineering, Navy Department, Washington, D. C.
Patton, J. B., Lieutenant Commander, U. S. N.
Payne, F. R., Lieutenant Commander, U. S. N.
Perrill, H. P., Lieutenant, U. S. N.
Pickrell, J. M., Lieutenant, U. S. N. (retired).....Subletts, Powhatan Co., Va.
Potts, Stacy, Commander, U. S. N.....Navy Yard, Bremerton, Wash.
Powelson, W. V. N., Lieutenant, U. S. N. (retired),
Union Electric Light and Power Co., St. Louis, Mo.
Price, C. B., Lieutenant Commander, U. S. N.
Price, H. B., Lieutenant Commander, U. S. N.
Procter, A. M., Lieutenant Commander, U. S. N.

Raby, J. J., Lieutenant, U. S. N.,.....Union Iron Works, San Francisco, Cal.
Raudenbush, W. R.
Redgrave, DeWitt C., Commander, U. S. N. (retired)....U. S. Naval Academy, Annapolis, Md.
Reed, Milton E., Lieutenant Commander, U. S. N.
Reeves, I. S. K., Captain, U. S. N.,
Board of Inspection and Survey, Mills Building, Washington, D. C.
Reinburg, J. E., Captain, U. S. R. C. S.,
Superintendent, School of Instruction, Revenue Cutter Service, Arundel Cove, Md.
Reynolds, W. H., Lieutenant, U. S. N.
Rhodes, John B. Midshipman, U. S. N.
Richter, C. A., Ensign, U. S. N.
Roberts, Edward E., President, The Roberts Safety Water-Tube Boiler Co.,
39 and 41 Cortlandt street, New York, N. Y.
Robertson, Ashley H., Lieutenant Commander, U. S. N.
Robison, John K., Lieutenant Commander, U. S. N.
Roche, G. W., Chief Engineer, U. S. N. (retired).....1304 McCulloh street, Baltimore, Md.
Roelker, C. R., Rear Admiral, U. S. N. (retired).....1434 Q street, N. W., Washington, D. C.
Roller, F. W., Consulting Engineer.....203 Broadway, New York, N. Y.
Rommell, C. E., Commander, U. S. N. (retired).....1904 Spring Garden street, Philadelphia, Pa.
Root, Chas. S., 1st Assistant Engineer, U. S. R. C. S.,
Division, Revenue Cutter Service, Treasury Department, Washington, D. C.
Ross, T. W., Mechanical Engineer .....111 33d street, Newport News, Va.
Ruhm, T. F., Naval Constructor, U. S. N.....Care Moran Brothers, Seattle, Washington.
Ryan, J. P. J., Lieutenant Commander, U. S. N.

Salisbury, G. R., Commander, U. S. N.
Sampson, B. C. B., Commander, U. S. N. (retired).....208 Park avenue, Galena, Ill.
Schoenborn, H. F., Chief Engineer, U. S. R. C. S.,
"The Harvard," Harvard street, N. W., Washington, D. C.
Scott, J. Alvah, Naval Architect and Marine Engineer.....95 Liberty street, New York, N. Y.
Scribner, E. H., Commander, U. S. N. (retired).....70 Tyler Park, Lowell, Mass.
Selfridge, J. R......2615 California street, San Francisco, Cal.
Shane, L., Lieutenant, U. S. N.....211 Paron street, West Philadelphia, Pa.
Sheedy, Joseph E., 2d Assistant Engineer, U. S. R. C. S...U. S. S. *Mohawk*, Tompkinsville, N. Y.
Sheffield, F. L., Lieutenant, U. S. N.
Sims, Gardiner C., President, Wm. A. Harris Steam Engine Co.....Providence, R. I.
Slayton, H. O., Chief Engineer, U. S. R. C. S. (retired).....P. O. Box 28, Port Townsend, Wash.
Sloane, John D., Assistant Engineer, U. S. N. (retired).....P. O. Building, Dubuque, Iowa.
Sloan, Robert S., President, Fitzgibbons Boiler Co.....Oswego, N. Y.
Smith, J. A. B., Rear Admiral, U. S. N.....19 Halsey street, Brooklyn, N. Y.
Smith, S. L......90 Elm Hill avenue, Boston, Mass.

348

Smith, Stuart F., Naval Constructor, U. S. N.
Smith, W. Strother, Commander, U. S. N.
Smith, W. Stuart, Assistant Engineer, U. S. N. (retired).....2538 Dwight Way, Berkely, Cal.
Smith, W. W., Lieutenant, U. S. N.
Snow, Elliot, Naval Constructor, U. S. N.....Navy Yard, Boston, Mass.
Soule, Henry B., Lieutenant, U. S. N.
Spangler, Henry W., Prof. Mechanical Engineering,
University of Pennsylvania, Philadelphia, Pa.
Spear, H. W., Chief Engineer, U. S. R. C. S.....Depot, U. S. R. C. S., Arundel Cove, Md.
Spear, Lawrence, Vice President, Electric Boat Co., Fore River Shipbuilding Co., Quincy, Mass.
Stevenson, H. N., Commodore, U. S. N. (retired).
Stickney, Herman O., Lieutenant Commander, U. S. N.
Strasburger, R. B., Ensign, U. S. N.
Strong, Frank L., Consulting Engineer.....2 Isla de Romero, Manila, P. I.
Sweet, George C., Lieutenant, U. S. N.

Tawresey, John G., Naval Constructor, U. S. N.....Union Iron Works, San Francisco, Cal.
Taylor, R. D., Passed Assistant Engineer, U. S. N. (retired),
3116 Haverford ave., Philadelphia, Pa.
Taylor, Walter.....Llewellyn Iron Works, Los Angeles, Cal.
Theiss, Emil, Lieutenant Commander, U. S. N.
Thomas, Samuel B., Lieutenant, U. S. N.
Tobin, J. A., Engineer Corps, U. S. N. (retired).....32 Vine street, East Providence, R. I.
Towne, N. P.....1939 N. 31st street, Philadelphia, Pa.
Trench, M. E., Lieutenant Commander, U. S. N.
Trilley, Joseph, Rear Admiral, U. S. N. (retired).....Pacific Grove, Monterey Co., Cal.
Trowbridge, Prof. Amasa .....Veeder Manufacturing Co., Hartford, Conn.
Turner, J. B., Engineer, U. S. R. C. S.....Care Treasury Department, Washington, D. C.

Usina, M. N., Engineer, U. S. R. C. S.....U. S. S. *Seminole*, Care Custom House, Boston, Mass.

Van Buren, John D.....New Brighton, N. Y.
Van Duzer, Louis S., Lieutenant Commander, U. S. N.
Varney, W. H., Naval Constructor, U. S. N. (retired)..... 712 N. Carey street, Baltimore, Md.

Walker, J. E., Lieutenant, U. S. N.
Walton, John Q., Chief Engineer, U. S. R. C. S.,
Treasury Department, Division Revenue Cutter Service, Washington, D. C.
Webber, E. P., Chief Engineer, U. S. R. C. S.....U. S. S. *Pamlico*, New Bern, N. C.
Webster, H., Rear Admiral, U. S. N.....Care C. B. Ford Co., Richmond, Va.
Wells, Chester, Lieutenant Commander, U. S. N.
Wells, W. B., Lieutenant, U. S. N.
Wheeler, Charles A., Engineer, U. S. R. C. S.
White, W. R., Lieutenant, U. S. N.
Whitham, Jay M., Consulting Engineer.....607 Bullitt Building, Philadelphia, Pa.
Williamson, John D.....1134 Shackamoran street, Philadelphia, Pa.
Willits, A. B., Captain, U. S. N.....Navy Yard, Norfolk, Va.
Willits, Geo. S., Commander, U. S. N.....New York Shipbuilding Co., Camden, N. J.
Wilson, F. A., Chief Engineer, U. S. N. (retired).....163 Bellvue avenue, Melrose, Mass.
Winship, Emory, Lieutenant, U. S. N. (retired).
Winston, H. T., Lieutenant, U. S. N.
Wright, R. K.,.....Box, 390, Caracas, Venezuela.

Yates, A. F. H., Lieutenant, U. S. N.
Young, F. H., 2d Assistant Engineer, U. S. R. C. S.....U. S. R. C. *Seminole*, Wilmington, N. C.

Zane, A. V., Commander, U. S. N.....Wm. Cramp & Sons Shipbuilding Co., Philadelphia, Pa.

ASSOCIATES.

Abel, Edwin F., Jr.....Dept. Steam Engineering, Navy Yard, Norfolk, Va.
Aborn, George Pennell, Constructing Engineer, Geo. F. Blake Mfg. Co., 3d street, E. Cambridge, Mass.
Alexander, James Nelson....Care New York Shipbuilding Co., Camden, N. J.
Allen, Arthur P., Mechanical Engineer....Care Pacific Engineering Co., Seattle, Wash.
Allen, F. S., Chief Inspector, Hartford S. B. Insp. & Ins. Co...42 Seymour street, Hartford, Conn.
Allen, R. H.....34 Avon Way, Quincy, Mass.
Almy, Darwin, President and Treasurer, Almy Water-Tube Boiler Co., 178 to 184 Allen avenue, Providence, R. I.
Anderson, Ernest H. B....Care Thorpe, Platt & Company, 97-103 Cedar street, New York, N. Y.
Archambault, C. V.....Residence, 234 East Montgomery street, Baltimore, Md.
Arentz, H. S., Supervising Engineer, R. Norwegian Navy....Horten, Norway.
Arnold, G. L. H.....111 South Boulevard, Dayton, Ohio.
Ayres, Gustav....1006 F street, N. W., Washington, D. C.

Babcock, W. I.....719 Maritime Building, Battery Park, New York, N. Y.
Bailey, Charles F., Chief Engineer, Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Bailey, W. H., Agent, American Tube Works....20 Gold street, New York, N. Y.
Beavor-Webb, J., Naval Architect and Engineer....93 Wall street, New York, N. Y.
Beggs, John I., President Milwaukee Electric Railway and Light Co., Pfister Hotel, Milwaukee, Wis.
Bennett, Samuel, Consulting Engineer and Naval Architect, Suite 22, Haller Building, Seattle, Wash.
Bent, Stedman....Overbrook, Montgomery Co., Pa.
Berner, N. A.....Stag Hall, Sparrows Point, Md.
Biles, J. Harvard, Professor Naval Architecture, University of Glasgow....Glasgow, Scotland.
Binney, Arthur, Naval Architect....Mason Building, Kilby street, Boston, Mass.
Blomberg, C. A., Marine Engineer....Fore River Shipbuilding Co., Quincy, Mass.
Bohman, Sigurd L.....65 Cleverly Court, Quincy Point, Mass.
Bolton, Reginald Pelham....527 Fifth avenue, New York, N. Y.
Bonner, Wm. T.....246 Summer street, Boston, Mass.
Bonson, William Watts, Gen. Manager, Smedley Steam Pump Co....Dubuque, Iowa.
Bouvier, E. R.....Navy Yard, Puget Sound, Wash.
Bowers, Chas. C.....151 Chilton street, Elizabeth, N. J.
Bradfield, Geo. K.....Vacuum Oil Company, 29 Broadway, New York, N. Y.
Bragg, Edward M., S. B.....3410 West avenue, Newport News, Va.
Brinton, F. S.....Lee & Brinston, Seattle, Wash.
Brooker, Chas. F., President, Coe Brass Mfg. Co....Torrington, Conn.
Brown, J. E., President, Altman & Taylor Machinery Co....Mansfield, Ohio.
Burchard, Anton....The Goulds Manufacturing Co., Seneca Falls, N. Y.
Burgess, W. Starling, Naval Architect....Burgess and Packard, 131 State street, Boston, Mass.
Burnham, Capt. W. D., Manager American-Hawaiian S. S. Co., Maritime Building, 8 Broadway, New York, N. Y.
Bushnell, Fred. N., Mechanical Engineer, Stone & Webster Engineering Corporation, 84 State street, Boston, Mass.
Busley, Carl, Professor, Geheimer Regierungsrath...Kronprinzen Ufer 2, Berlin, N. W., Germany.

Cain, J. J., Superintendent Babcock & Wilcox Co....93 First street, Bayonne, N. J.
Calder, C. B., Toledo Shipbuilding Co....Toledo, Ohio.
Caldwell, Andrew J.....Newburgh, N. Y.
Campbell, J.....35 Weybosset street, Providence, R. I.
Carlson, A. G.....Nya Aktie bolagets Atlas, Stolkholm, Sweden.
Carnes, W. F., Mechanical Engineer....Alhambra Apartments, W. 10th street, Wilmington, Del.
Chace, Mason S.....31 Wales street, Dorchester, Boston, Mass.
Church, E. F., Jr.....P. O. Box 622, Morgantown, W. Va.

Cleghorn Alexander, Manager, The Fairfield Shipbuilding & Engineering Company, Ltd., Govan, Glasgow, Scotland.
Colding, Dr. Henry S.....117 West 70th street, New York, N. Y.
Cop, Huibert, Naval Constructor 1st Class, Dutch Navy, Professor R. Polytechnic School, Delft, Holland.
Cornell, H. E.....Quintard Iron Works, foot of 12th street, East River, New York, N. Y.
Coryell, Edwin M., Superintendent, A. S. Cameron Steam Pump Works, 433 East 23d street, New York, N. Y.
Cousins, C. C.....506-7 New York Life Building, Montreal, Canada.
Cox, Irving, Naval Architect .....68 Broad street, New York, N. Y.
Cramp, Benjamin H., Brass Founder.....York and Thompson streets, Philadelphia, Pa.
Cramp, Edwin S.....127 East 61st street, New York, N. Y.

Davidson, C. J., Chief Engineer Milwaukee Electric Railway and Light Co.....Milwaukee, Wis.
Davidson, Marshall T., Marine and Mechanical Engineer...43 to 53 Keap street, Brooklyn, N. Y.
Davis, Chas. H., Civil Engineer.....South Yarmouth, Mass.
Davis, Leonard D.....Residence, 2668 Peach street, Erie, Pa.
deKinder, J. J., Consulting Engineer and Attorney at Law .....Girard Building, Philadelphia, Pa.
Delanoy, Chas. E.....1757 Sedgwick avenue, Morris Heights, New York, N. Y.
De Long, H. W.....P. O. Box 1036, Bath, Maine.
Denton, Wm., Swan, Hunter, and Wigham Richardson, Ltd., Wallsend Shipyard, Wallsend-on-Tyne, England.
Detrick, H. L.....1449 Rich street, Los Angeles, Cal.
Dickey, William D.....Mechanical Engineer, Room 409, Produce Exchange, New York, N. Y.
Dickinson, Randall T., Superintending Constructor, Delaware River Iron Shipbuilding and Engine Works, Chester, Pa.
Dimm, W. T.....Care Newport News S. & D. D. Co., Newport News, Va.
Dingwall, N. W.....Townsend-Downey S. B. Co., 12 Broadway, New York, N. Y.
Dow, George E., President, Geo. E. Dow Pumping Engine Co., 179 First street, San Francisco, Cal.
Drewett, W. A., Superintendent Davidson's Pump Works, 524 Lafayette avenue, Brooklyn, N. Y.
DuBosque, F. L., Assistant Engineer, Floating Equipment, Pennsylvania Railroad Co., Jersey City, N. J.
Dudley, Charles B.....P. O. Drawer 156, Altoona, Pa.

Eaton, W. N., Mechanical Engineer, Bureau of Steam Engineering, Navy Department, Washington, D. C.
Edwards, Chas. B., Superintendent of Engineering, Fore River Shipbuilding Co...Quincy, Mass.
Ekstrom, Ernest G., Engineer-in-Chief, Benedictine Mining and Milling Co., Consolidated, Los Angeles, Cal.
Elgar, Francis, LL. D., Naval Architect, 18 Conwall Terrace, Regents Park, London, N. W., England.
Elliott, W. E., Superintending Engineer, Goodrich Transportation Co.....Chicago, Ill.
Ellis, John F., Mechanical Engineer.....89 Migeon avenue, Torrington, Conn.
Elmquist, E. F., Naval Constructor, Swedish Navy.....Carlskrona, Sweden.
Erisman, Martin E., Naval Architect.....Lambertville, N. J.
Everest, Charles Marion, Vice President, Vacuum Oil Company.....Rochester, N. Y.
Ewertz, E. H.....63 Brook street, Wallaston, Mass.
Ewry, Ray C., Draughtsman, Department S. E.....Navy Yard, New York, N. Y.
Eyermann, Peter, Mechanical Expert.....DuBois Iron Works, DuBois, Pa.

Fairburn, W. A., Naval Architect and Engineer.....P. O. Box 183, Quincy, Mass.
Fergus, Alexander.....Fairfield Shipbuilding and Engineering Co., Govan, Scotland.
Fergusson, M.....55 Wall street, New York, N. Y.
Ferguson, Wilfred H.....Fairfield Works, Govan, Glasgow, Scotland.
Ferris, T. E .....Care Townsend & Downey, Mariners Harbor, Staten Island, N. Y.

Fletcher, Andrew, Jr., member of firm of W. & A. Fletcher Co., Hudson, 12th to 14th street, Hoboken, N. J.
Fletcher, Wm. H., of firm of W. & A. Fletcher Co.....Hudson, 12th to 14th street, Hoboken, N. J.
Foley, Nelson, Civil Engineer.....Gaiola, near Posilipo, Naples, Italy.
Folmer, H. V......Department S. E., Navy Yard, Mare Island, Cal.
Foran, George J., with the International Pump Co., Residence, 471 Central Park West, New York, N. Y.
Forbes, W. D., Mechanical Engineer .....1300 Hudson street, Hoboken, N. J.
Forsyth, Robert.....1697 Vallejo street, San Francisco, Cal.
Foster, Charles A......Care McConnell Engineering and Machine Co., Tacoma, Wash.
Foster, J. M......Foster Engineering Co., Newark, N. J.
Fotheringham, R. M......410 Bird avenue, Buffalo, N. Y.
Fraser, J. Imbrie.....Clifton Row, Dunbartonshire, Scotland.
Frear, Hugo P., Naval Architect.....Union Iron Works, San Francisco, Cal.

Gabel, John F., Office of Naval Inspector of Engineering Material, 6 Beacon street, Room 519, Boston, Mass.
Gardner, Fred A., Engineer-in-Chief..... .....Union Iron Works, San Francisco, Cal.
Geary, D. J., Vice President and General Manager, Oil City Boiler Works, Bissell avenue, Oil City, Pa.
Geary, J. R......23 Water street, Yokohama, Japan.
Gibbs, A. W., General Superintendent, Motive Power, Pennsylvania Railroad.....Altoona, Pa.
Gielow, H. J., Naval Architect .....50 Broadway, New York, N. Y.
Gilchrist, Archibald.....Stobcross Engine Works, 36 Finnieston street, Glasgow, Scotland.
Goodenough, Walter J......Exchange Place, New York, N. Y.
Goshen, Marcus H......Department Steam Engineering, Navy Yard, Mare Island, Cal.
Gregory, H. B......4801 Huntington avenue, Newport News, Va.
Gundersen, A...... ....Care Ackers, Mekaniske Verksted, Christiana, Norway.
Guy, A. E......Care DeLaval Steam Turbine Co., Trenton, N. J.

Hall, Hewitson, Core Turbinia Works.....Wallsend-on-Tyne, England.
Hammar, Hugo G., Superintendent, Goteborgs Nya Verkstads.....Göteborg, Sweden.
Hand, H. W......Wm. Cramp & Sons' Ship and Engine Building Co., Philadelphia, Pa.
Hanscom, I. C., Naval Architect.....Drafting Department, Navy Yard, Portsmouth, N. H.
Hartley, Geo. B...... The Solvay Process Co., Syracuse, N. Y.
Haas, Hans, Dipl. Engineer.....Birkenalle, 8a, Stettin, Germany.
Hatta, J., Engineer Lieutenant, I. J. N.....The Imperial Naval College, Etazima, Aki, Japan.
Hayes, Jos. F., Chief Engineer and Marine Supt. Acme Steamship Co., 700 Wolvin Bldg., Duluth, Minn.
Heffernan, J. T., Heffernan Engine Works.....108 Railroad avenue, Seattle, Wash.
Higgins, C. P., Mechanical Engineer.....320 Chestnut street, Roselle, N. J.
Higgins, H. C......81 Beach street, New York, N. Y.
Hillhouse, P. A., B. Sc......Fairfield Shipyard, Glasgow, Scotland.
Hitchcock, E. A., Professsor Ohio State University.....380 West 8th avenue, Columbus, Ohio.
Hopkins, Albert Lloyd.....Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Horton, F. N......13 Intervale Park, Dorchester, Mass.
Howard, O. Z., Draftsman, U. S. Naval Experiment Station, 50 Franklin street, Annapolis, Md.
Hoxie, Wm. D., Vice President, Babcock & Wilcox Co.....85 Liberty street, New York, N. Y.
Hubbard, R. S...... .....Care William Beardmore & Co., Dalmuir, N. B.
Hugo, Victor, Chief Inspector, Hartford S. B. I. and I. Co.....Security Building, St. Louis, Mo.
Hyde, Charles E., President and General Manager, New London Marine Iron Works, New London, Conn.
Hyde, John Sedgwick, President and General Manager, Bath Iron Works.....Bath, Me.

Jenks, S. G......Jenks Shipbuilding Co., Port Huron, Mich.
Jones, A. W., Secretary, Monitor Electrical Speed Recorder Co., 274 Pearl street, Cambridge, Mass.
Jordan, S. S., Engineer and Naval Architect.....290 Danforth street, Portland, Me.

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Katzenstein, L., Mechanical Engineer.....358 West street, New York, N. Y.
Kenney, Lewis H., B. S., M. E., Draftsman in Charge Dept. Steam Engineering,
League Island, Philadelphia, Pa.
Keough, William T., Consulting Engineer,
Room 508, Board of Trade Building, 131 State street, Boston, Mass.
Kimball, W. E......39 Standish avenue, Walloston, Mass.
King, Frank B., Marine Engineer and Naval Architect...1442 Rhode Island av., Washington, D. C.
Kirby, Frank E., Engineer.....609 Stevens Building, Grand River avenue, Detroit, Mich.

Lacey, C. C., Marine Superintendent, G. N. S. S. Co.....Seattle, Wash.
Laing, Andrew, General Manager, Wallsend Slipway and Engineering Co.,
Newcastle-on-Tyne, England.
Lake, Simon.....P. O. Box 256, Bridgeport, Conn.
Lambert, John, Surveyor to Lloyds Register,
Lloyds Register of British and Foreign Shipping, Hong Kong, China.
Lappan, James, Esq., President, The James Lappan Mfg. Co., 20th and Pike sts., Pittsburg, Pa.
Laval, George de, General Manager, Henry R. Worthington.....Harrison, N. J.
Layman, Alfred C......306 Rodney street, Wilmington, Del.
Lea, Edward S., President, Motor Car Specialty Co.....Trenton, N. J.
Leavy, Wm. H., U. S. A. T. *Sumner*.....Newport News, Va.
Lee, Clifton, Jr., Office of Inspector Machinery, Bath Iron Works.....Bath, Me.
Leventhal, Philip.....1 Broadway, New York, N. Y.
Libbey, Jos. Harold.....14 Parsons street, West Newton, Mass.
Lillie, S. Morris.....328 Chestnut street, Philadelphia, Pa.
Lincoln, J. M......405 Lenox avenue, New York, N. Y.
Livingstone, W. A., Marine Engineer.....Box 555, Detroit, Mich.
Longstreth, Chas......427 N. 13th street, Philadelphia, Pa.
Lovekin, Luther D., Chief Engineer New York Shipbuilding Company,
6320 Drexel Road, Overbrook, Philadelphia, Pa.
Lovell, Ralph L......Fore River Shibuilding Co., Quincy, Mass.

McAllaster, Eugene L., Consulting Engineer and Naval Architect,
22 Haller Building, Seattle, Wash.
McClintock, J. E......Oil City Boiler Co., 39 Cortlandt street, New York, N. Y.
McDermott, Geo. R., Professor of Naval Architecture.....Cornell University, Ithaca, N. Y.
McInnes, John.....Superintendent Construction, Bath Iron Works, Bath, Maine.
McMurray, Robert K., Chief Inspector, Hartford Steam Boiler Inspection and Insurance Co.,
100 William street, New York, N. Y.
Macalpine, John H., Mechanical Engineer.....615 Walnut street, Philadelphia, Pa.
MacQueen, J......23 Coleraine Road, Westcombe Park, S. E., London, England.
Magoun, H. A......Maryland Steel Company, Sparrows Point, Md.
Malmquist, H......Kockums Mek. Werkstads Aktiebolag, Malmö, Sweden.
Marriner, W. W......Yarrow & Co., Ltd., Isle of Dogs, Poplar E., London, England.
Maschmeyer, A. M. P......Bureau of Steam Engineering, Navy Department, Washington, D. C.
Mattson, A. George, Mechanical Engineer, Great Lakes Engineering Works.....Detroit, Mich.
Meier, E. D., President and Chief Engineer, Heine Safety Boiler Co.,
11 Broadway, New York, N. Y.
Mellin, Carl J., Chief Engineer, American Locomotive Co.....Schenectady, N. Y.
Mentz, W., Professor, (Lehrstuhl für Schiffsmaschinenbau),
Langfuhr bei Danzig Konigliche Technische Hochschule, Germany.
Mesney, Arthur B. Le Patourel,
Bureau Steam Engineering, Navy Department, Washington, D. C.
Meyer, J. H. F......Bureau Steam Engineering, Navy Department, Washington, D. C.
Millard, J. W., Naval Architect and Engineer,
Chesebrough Building, 17 State street, New York, N. Y.

Mills, E......Babcock & Wilcox Co., Bayonne, N. J.
Mitzutani, Yoshihiko, Fleet Engineer, I. J. N.....Naval Dockyard, Kure, Japan.
Mohr, Louis, Secretary and Consulting Engineer...John Mohr & Sons, 32 Illinois st., Chicago, Ill.
Monteagle, Robert Charles, Chief Engineer, The Atlantic Works.....East Boston, Mass.
Montgomery, H. M., Merchant.....Horne Insurance Building, 205 La Salle street, Chicago, Ill.
Mooney, Thomas, Engineer.....Delaware River, I. S. B. and E. Works, Chester, Pa.
Moore, C. C......3100 Washington street, San Francisco, Cal.
Moran, Robt......Rosario, San Juan County, Wash.
Morris, Edward T., Superintending Engineer, Oceanic S. S. Co.,
1380 Ninth avenue, East Oakland, Cal.
Morton, Richard, Jr., Manufacturer's Agent....Room 903, Maryland Trust Bld , Baltimore, Md.
Mosher, Charles D., Naval Architect and Marine Engineer.....1 Broadway, New York, N. Y.
Murphy, E. J., Consulting Engineer, Hartford S. B. Insp. and Ins. Co.....Hartford, Conn.
Murray, John, Superintending Engineer.....2196 Hayes street, San Francisco, Cal.

Newell, W. S......P. O. Box 1197, Bath, Me.
Newman, Richard L.,
"The Den," Esquimalt Road, care Beaumont P. O., Victoria, British Columbia.
Nicholson, J H......Room 1708, Frick Building, Pittsburg, Pa.
Niclausse, J......24 Rue des Ardennes, Paris, France.
Normand, Mr. Augustin, Jr......67, Rue Du Perry, Havre, France.
Nystedt, Thure, Naval Constructor, Royal Swedish Navy,
Stockholm, Sheppsholmen 8, Sweden.

Oliver, John W......Department Steam Engineering, Navy Yard, Mare Island, Cal.

Palen, Fredk. P......Newport News S. & D. D. Co., Newport News, Va.
Palmer, Nicholas F., Proprietor, Quintard Iron Works.....742 East 12th street, New York, N. Y.
Parsons, H. DeB., Consulting Engineer.....22 William street, New York, N. Y.
Peabody, E. H.,.....Scientific Dept., Babcock & Wilcox Co., 85 Liberty street, New York, N. Y.
Peacock, Edw. L......Care Simon Lake, 3 B Universitats Strasse, N. W., 7 Berlin, Germany.
Pearson, F. S......20th Floor, 25 Broad street, New York, N. Y.
Pell, Harry S., Superintendent, Niles Boiler Company.....Niles, Ohio.
Penton, Henry, Chief Engineer, Great Lakes Engineering Works,
814 Perry Payne Building, Cleveland, Ohio.
Piercy, Frank, Engineering Staff, Wallsend Slipway and Engineering Company,
110 High Park Road, Newcastle-on-Tyne, England.
Platt, John, Consulting Engineer.....97 Cedar street, New York, N. Y.
Pocock, A. J......16 Edgewood avenue, Dayton, Ohio.
Post, W. A., Superintendent, Newport News S. & D. D. Co.....Newport News, Va.
Pray, Thomas, Jr., Consulting Engineer and Electrician.....P. O. Box 2809, Boston, Mass.

Quick, George, Fleet Engineer, Royal Navy.....Rosemead, Maidenhead, Bath Road, England.
Quintard, Geo. W......Care Palmer and Co., 40 Wall street, New York, N. Y.

Raynal, Alfred H., Mechanical Engineer,
Bureau Steam Engineering, Navy Department, Washington, D. C.
Richson, Carl, Naval Constructor, Royal Swedish Navy...Riddarholmen 11, Stockholm, Sweden.
Riley, Geo. N......National Tube Co., Frick Building, Pittsburg, Pa.
Rittenour, Fred H., Department Marine Engineering and Naval Construction,
Naval Academy, Annapolis, Md.
Robinette, Howard A......1006 F street, N. W., Washington, D. C.
Robinson, Edward P., Superintendent, The Atlantic Works.....70 Border st., East Boston, Mass.
Rossell, Axel G......Care Wm. Cramp & Sons S. & E. B. Co., Philadelphia, Pa.

Rottmer, H. E......Bureau of Construction and Repair, Navy Department, Washington, D. C.
Rowland, Thomas F., Jr., Secretary and Treasurer, The Continental Iron Works, Brooklyn, N. Y.
Rozycki, L. O. Stephen, Draftsman,
Bureau of Steam Engineering, Navy Department, Washington, D. C.

Salmon, Fred. W., Civil and Mechanical Engineer.....127 S. Central avenue, Burlington, Iowa.
Schreidt, Frank, President, Safety Cylinder Valve Co.....P. O. Box 422, Mansfield, O.
Schulze, Henry H.....Care Fore River Shipbuilding Co., Quincy, Mass.
Scout, Morris C., Chief Engineer, S. S. *Caracas*, Red D Line,
Pier 11, East River, Brooklyn, N. Y.
Seabury, Charles L.....Morris Heights, New York, N. Y.
Seaton, Wm., Jr......C. W. Hunt Company, 45 Broadway, New York, N. Y.
See, Horace, Marine Engineer and Naval Architect.....1 Broadway, New York, N. Y.
Sella, Charles de Grave, M. I. C. E.....1 Piazza Demarini, Genoa, Italy.
Seymour, J. Alward.....3 Linden Place, Auburn, New York, N. Y.
Shedd, Albert R.....120 P. O. and S. T. Building, Boston, Mass.
Sicard, Wm. F......Bureau Steam Engineering, Navy Department, Washington, D. C.
Sillen, Hillmer Fr.....Jönköpings Mek. Verkstad, Jönköpings, Sweden.
Simpson, George.....415 Newport avenue, Wallaston, Mass.
Smith, Charles Randolph.....Messrs. Barclay Curle & Co., Ltd., Glasgow, Scotland.
Smith, F. B., Chief Engineer, Pittsburg Steamship Co.....Rockefeller Building, Cleveland, Ohio.
Smith, Sommers N.....1422 Girard avenue, Philadelphia, Pa.
Speck, William, Lieutenant, Naval Militia of California,
California Gear Works, 2130-32 Folsom street, San Francisco, Cal.
Stebbins, Roger P......Electric Boat Company, Quincy, Mass.
Stephens, W. P.....Thirty-second street and Avenue A, Bayonne, N. J.
Stevens, E. A., President, Hoboken Ferry Co.....1 Newark street, Hoboken, N. J.
Stuart, Sinclair, Surveyor to the U. S. Standard Register of Shipping,
Post Building, 16 Exchange Place, New York, N. Y.
Syme, Jas......Fairfield Works, Govan, Glasgow, Scotland.

Taft, H. S.....29 West 37th street, New York, N. Y.
Takagi, Tachisaburo, Commander, Naval Constructor, I. J. N.,
Naval Dock Yard, Myizuru, Japan.
Takakura, S., Naval Constructor, Imp. Japanese Navy,
Care Osaka Iron Works, Kawaguchi, Osaka, Japan.
Taylor, Stevenson.....742 East 12th street, New York, N. Y.
Thomas, Arthur T.,
Lloyds' Register of British and Foreign Shipping, 342 Argyle street, Glasgow, Scotland.
Thomas, Carl C.....Sibley College, Cornell University, Ithaca, N. Y.
Thornycroft, Sir John I.....Chiswick, London, S. W., England.
Thunberg, Ernst, Superintendent of the Gunworks of Bofors-Gullspong Co.....Bofors, Sweden.
Thurn, Theodore, L. A.....Care General Electric Co., Osaka, Japan.
Traill, Robert.....6 Windsor Crescent, Whitley Bay, Northumberland, England.
True, Dwight.....288 Avery avenue, Detroit, Mich.
Tucker, Edwin W., Mechanical Engineer.....818 Page street, San Francisco, Cal.
Turnbull, John.....258 Chillingham Road, Heaton, Newcastle-on-Tyne, England.

Uhler, George, Supervising Inspector General Steamboat Inspection Service,
Department Commerce and Labor, Washington, D. C.

Van Vleck, Frank.....3014 Park avenue, Baltimore, Md.
Varney, William Wesley, Mechanical Engineer and Attorney at Law,
712 N. Carey street, Baltimore, Md.
Volz, Wm. E., Mechanical Engineer,
Care Wheeler Condenser and Engineering Co., 42 Broadway, New York, N. Y.
Voss, Ernest, Marine Engineer, Blohm & Voss, Shipbuilders and Engineers...Hamburg, Germany.

365

Wachsmann, Wm., Mechanical Engineer,
Bureau Steam Engineering, Navy Department, Washington, D. C.
Wadagaki, Yasuzo, Naval Constructor, I. J. N.....Imperial Naval Dockyard, Sasebo, Japan.
Wagner, F. H., Commander, M. N. G.....1429 Madison avenue, Baltimore, Md.
Wannop, C. H......Care Alex. Stephen & Son, Linthouse, Govan, Glasgow, Scotland.
Ward, Charles, Engineer and Contractor, Manufacturer Ward Boiler.....Charleston, W. Va.
Ward, B. F., Superintending Engineer, N. Y. C. and H. R. R. Co.,
330 Central avenue, West Hoboken, N. J.
Warrington, James N......1419 Dominis street, Honolulu, T. H.
Webster, Daniel M.....210 Woodland avenue, Woodhaven, New York.
Webster, Hosea.....174 Mountain avenue, Montclair, N. J.
Webster, William R., Jr......Bridgeport Brass Co., Bridgeport, Conn.
Weir, Geo. Dobie, Manager, Sunderland Engineering Works .....Sunderland, England.
Wells, Theodore D......32 Broadway, New York, N. Y.
Wetherbee, Chas. P., Superintendent of Engineering.....Bath Iron Works, Bath, Me.
Wheeler, Fredk. Meriam, Mechanical Engineer.....159 Gates avenue, Montclair, N. J.
Whitaker, M. M......51 Quincy street, Brooklyn, N. Y.
White, George H., General Superintendent, Oil City Boiler Works,
4 Lincoln street, Oil City, Pa.
Whiting, S. B., General Manager, Calumet and Hecla Mining Co.,
11 Ware street, Cambridge, Mass.
Wiley, Clarence W......Box 202, Seattle, Wash.
Wilkinson, James.....Box 82, North Station, Providence, R. I.
Williams, Sam'l T......1719 E. Lanvale street, Baltimore, Md.
Wilson, R. C., Consulting Engineer.....4927 Perrier street, New Orleans, La.
Winant, Wm. E......1912 13th street, N. W., Washington, D. C.
Wintringham, H. C., Naval Architect and Engineer,
Hudson Building, 32 Broadway, New York, N. Y.
Wolvin, A. B., President and General Manager, Acme Steamship Co.....Duluth, Minn.
Wood, S. L......Lake Placid Club, Essex County, N. Y.
Woolson, H. T......Care Gas Engine and Power Co., Morris Heights, New York, N. Y.

Yarrow, A. F., Naval Architect and Mechanical Engineer, Isle of Dogs, Poplar, London, England.

Zeiter, Fr., Marine Engineer.....Bülow street, 22, Bremen, Germany.

SUBSCRIBERS.

Vice-Admiral Ahmed Pasha, M. I. Mech. E., Engineer-in-Chief,
Care British Post Office, No. 18 Box, Constantinople, Turkey.
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Benedetti, Vittorio De, "Il Macchinista Navale,".....via S. Giuseppe 21, Naples, Italy.
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Chef du Service dela Surveillance des Travaur Confils a l'Industrie, 248 Rue de Rivole, Paris, France.
Cordes, Robert, Buchhandling.....Brunswicker Strasse 35a, Kiel, Germany.
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Cruickshank, Alex.....Naval Proving Ground, Indian Head, Md.

Delaunay, Belleville & Cie.....St. Denis, Seine, France.
Department of Marine Engineering and Naval Construction, U. S. Naval Academy, Annapolis, Md.
Department Steam Engineering.....(via San Francisco), U. S. Naval Station, Cavite, P. I.
Department Steam Engineering.....Navy Yard, Boston, Mass.
Department Steam Engineering.....Navy Yard, League Island, Philadelphia, Pa.
Department Steam Engineering.....Navy Yard, Mare Island, California.
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Department Steam Engineering.....Navy Yard, New York, N. Y.
Direzione Costonzioni Navali Ro Arsenale.....Spezia, Italy.
Direzione delle Costruzione Navali Ro Arsenoli.....Naples, Italy.
Dupagnier, Mr. L.....9 Avenue de la Gare, Chalon-sur-Saone, Saone et Loire, France.

Ecole d'Application du Genie Maritime.....140 Boulevard Montparnasse, Paris, France.
Engineering College, Department of Naval Architects, Tokyo Imperial University, Tokyo, Japan.
Engineering College, Mechanical Engineering Department, Tokyo Imperial University, Tokyo, Japan.
Engineers' Club, Japanese Naval.....Care Kan-Sei-Shibu, Navy Department, Tokyo, Japan.
Equipment Department.....(Req. 143), Building No. 22, Navy Yard, New York, N. Y.
Equipment Officer.....Building No. 22, Navy Yard, New York, N. Y.
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Ferraz, Eduardo Gomez, Sr.....Arsenal de Marinha, Para, Brazil.
Fratelli, Orlando & Co.....Livorne, Italy.

General Electric Company, Publication Bureau.....Schenectady, N. Y.
German Embassy.....Washington, D. C.
Gildner, A. W., Jr.....213 34th street, Newport News, Va.

Hardy, J. W.....Casilla 51, Valparaiso, Chili.
Harvard University, Engineering Library.....Cambridge, Mass.
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Hughes, Thomas, Engineer Commander, R. N., 10 Angerstein Road, North End, Portsmouth, England.

Ide, Kenji, Commander, I. J. Navy.....Navy Department, Tokyo, Japan.
Imperial Naval Engineering College Library, Yokosuka.....Sagami, Japan.
Imperial Travelling Post, No. 10.....Verviers-Cologne, Germany.
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Inogawa, F.....Care International Curtis Marine Turbine Co., 2 Rector street, New York, N. Y.

John Crerar Library, The.....Chicago, Illinois.
Jones, Jerrard E., Warrant Machinist, U. S. N.

Kaigan Kohi Gakko.....Yokosuka, Japan.
Kaigunk, Daigak-o.....Naval Staff College, Tsukiji, Tokyo, Japan.
Kaigun-KiKan jit su-Renshujo.....Yokosuka, Japan.
Kamimura, Y......Care Fore River Shipbuilding Co., Quincy, Mass.
Kamo, J., I. Engineer Captain, I. J. N......Naval Engineering College, Yokosuka, Japan.
Kamo, M......4 Donne Quadrant, Kelvinside, N. Glasgow, Scotland.
Karljohansverns Verft.....Horten, Norway.
Kasama, T......Naval Dock Yard, Kure, Japan.
Kölner Bezirksverein Deutscher Ingenieure.....Köln, Germany.
(Lesezimmer Bürgergesellschaft.)
Kowji, Ito.....Karasumaru Marutamachi, Kioto, Japan.
Kühl, W. H., Bookseller.....73 Jaegerstrasse, Berlin, W., Germany.

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Luis da Cunha de Mancellos, Dieuteur de l'arsenal de la Marine.....Lisbon, Portugal.
Lynch, S. M., Purchasing Agent, National Tube Co.....Frick Building, Pittsburg, Pa.

Manning, Maxwell & Moore.....85, 87, 89 Liberty street, New York, N. Y.
Manufacturers' Advertising Bureau.....937 Broadway, New York, N. Y.
Markey, H. S......Care Union Iron Works, San Francisco, Cal.
Maruya, Z. P. & Co.....28 Benton Dori Nichorne, Yokohama, Japan.
Mechanics Mercantile Library.....San Francisco, Cal.
Melms & Pfenninger.....Müncher-Hirschau, Germany.
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Milner, J. W., Engineer Lieutenant, R. N.....Upper Cleasby Rd., Menston, Leeds, England.
Ministero della Marina, Direzione Generale delle, Costruzione Navila.....Roma, Italy.
Ministero della Marina, Ufficio di Stato Maggiore.....Roma, Italy.
Miyakawa, K......220 Azabu Honmura Machi, Tokyo, Japan.
Morgan, W. A., Warrant Machinist, U. S. N.
Murray, G. W., Engineer Commander, R. N.....Admiralty, Whitehall, London, S. W., England.

Nakajima, Yosohachi, I. J. N.
The Naval Inspector's Office, Parliament Chambers, Great Smith street,
Westminster, London, England.
Navigazione Generale Italiana (Alla), Ufficio Tecnico.....Genova, Italy.
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Newton, J. H., Midshipman, U. S. N.
New York Public Library.....40 LaFayette Place, New York, N. Y.
New York Public Library.....425 Lafayette street, New York, N. Y.
New York Shipbuilding Co......S. Camden, N. J.
New York Yacht Club.....37-41 West 44th street, New York, N. Y.
N. I. D......Care Kegan Paul, Trench, Trübner & Co., 43 Gerrard street, Soho, London, England.

Odero, N., & Co., Ship and Engine Builders.....Genoa, Italy.
Ohio State University Library.....Columbus, O.
Osaka-Shosen-Kaisha.....64 Tomishimacho, Kitaku, Osaka, Japan.

Pearce, R. S., Engineer Lieutenant, R. N.....H. M. S. *Suffolk*, Malta.
Pietro Brunelli, Capitano Navali.....Regis Arsenole, Napoli, Italy.
P. O. L., Care Kegan, Paul, Trench, Trubner & Co., Dryden House, 43 Gerrard street,
Soho, London, W., England.

Quartiermastro R. Marina.....Napoli, 3, Italy.

Reale Scuola Navale Superiore, il Signor Direttore.....1214 di Post, Genoa, Italy.
Riggs, F. B.....1415 Boren avenue, Seattle, Wash.
Robinson, Henry C.....17 Marsh street, Quincy, Mass.
Rotalde, Carlos, Midshipman, P. N..... U. S. S. *Missouri*, care Postmaster, New York, N. Y.

Saito, M., Lieutenant Constructor, I. J. N..... Admiralty, Tokyo, Japan.
Saka, Dr.....Kawasaki Dockyard, Kobe, Japan.
Schmidt, Herrn Fred, Buchhandling.....Wilhelmshaven, Germany.
Scientific Library..... U. S. Patent Office, Washington, D. C.
Scott's Shipbuilding and Engineering Co.....Greenock, Scotland.
Seattle Public Library.....Seattle, Wash.
Section Technique des Construction Navales..... No. 2 Rue Royale, Paris, France.
Section Technique des Constructions Navales, Ministere dela Marine,
2 Rue Royale, Paris, France.
Senhor Don Luiz da Cunlia de Marrcellos, Director Technics de Arsenal de Marinha,
Lisbon, Portugal.
S neddon, J. P., Superintendent, Stirling Co.....Barberton, Ohio.
So therns Marine Engineering College.....59 Bridge street, Glasgow, Scotland.
Sotto Direzione delle Construzioni Navali del R. Cantiere,
Castellammare di Stabia, Napoli, Italy.
State Library.....Sacramento, Cal.
Steiger, E., & Co.....Newspaper Box 298, New York, N. Y.

Taguchi, Kozo, Lieutenant.....Kure Navy Yard, Kure, Japan.
Tams, Lemoine & Crane.....52 Pine street, New York, N. Y.
Tappen, A. B.....4 South street, Utica, N. Y.
Terngoro, Fujii, Captain, I. J. N.....Care Admiralty, Tokio, Japan
The Naval Constructor.....United States Naval Station, New Orleans, La.
The Thomas Crane Public Library.....Quincy, Mass.
Thomas, H. E., Schiffbau Inginieur.....Grolmanstrasse 21, Charlottenburg, Germany.
Tomonoga, G., Lieutenant.....8 Everett street, Dorchester, Mass.
Toneguchi, Lieutenant Commander, I. J. N.....1464 Rhode Island avenue, Washington, D. C.

Ufficio Tecnico Ministero della Marina.....Roma, Italy.
Ufficio Tecnico della Ro Marina.....Genova, Italy.
University of Illinois Library.....University Station, Urbana, Ill.
University of Michigan Library.....Ann Arbor, Mich.

Vickers Sons & Maxim, Ltd.....Barrow-in-Furness, England.
(To the Director, Engine Department, Naval Construction Works.)
Viennot Advertising Agency.....524 Walnut street, Philadelphia, Pa.
Virgilio Giacomuzzi.....Sestri-Ponente, Genoa, Italy.

Waffenabteilung des Reichs-Marine-Amts.....Linkstrasse 7, Berlin W., Germany.
Wallace, John.....6 Lloyd's avenue, Fenchurch street, London, E. C. England.
Washington Society of Engineers.....729 Fifteenth street, N. W., Washington, D. C.
Watonabe, J., Engineer.....Care Fore River Shipbuilding Co., Quincy, Mass.
Webb's Academy and Home for Shipbuilders...Sedgwick and 188th streets, New York, N. Y.
Welch, J. J.....The Hollies, Westfield avenue, Gosfirth, Newcastle-on-Tyne, England.
Weld, Miss Lydia G.....4801 Huntington avenue, Newport News, Va.
Westinghouse Machine Co., The.....(43284) East Pittsburg, Pa.
Woods, J. S., Ensign, U. S. N.
Woodwell, Julian E., Inspector, Electric Light Plant, Treasury Department, Washington, D. C.

Yamashita, Gihachiro.
Yokura, M.....77 Shirokane-Sanko-Cho, Shibi, Tokio, Japan.

EXCHANGES.

American Machinist.....168 Fulton street, New York, N. Y.
American Marine Engineer, The ..... 315 Dearborn street, Chicago, Ill.
American Shipbuilder.....7 Coenties Slip, New York, N. Y.
American Society of Civil Engineers.....220 West 57th street, New York, N. Y.
American Society of Mechanical Engineers.....12 West 31st street, New York, N. Y.
Army and Navy Journal.....240 Broadway, New York, N. Y.
Army and Navy Register.....National Theater Building, Washington, D. C.
Association Technique Maritime.....16 Rue de l'Arcade, Paris, France.

Brass World and Platers' Guide, The .....220 John street, Bridgeport, Conn.

Cassier's Magazine.....World Building, New York, N. Y.
Club Militar Naval.....Rua do Carmo 43, Lisbon, Portugal.
Collegio degli Ingegneri Navali e Meccanici.....via David Chiossone, N. Y., Genoa, Italy.
Cordel & Renne.....Lietzenburger strasse, Berlin, W., Germany.

Die Turbine.....Kurfursten-Strasse 11, Berlin W. 57, Germany.
Engineer.....33 Norfolk street, Strand, London, W. C., England.
Engineering.....35 Bedford street, Strand, London, England.
Engineering Magazine .....140-142 Nassau street, New York, N. Y.
Engineering News.....St. Paul's Building, 220 Broadway, New York, N. Y.
Engineering Record.....239 West 39th street, New York, N. Y.
Engineers' Club.....1122 Girard avenue, Philadelphia, Pa.
Engineers' Society of Western Pennsylvania,
803 Fulton Building, 6th street and Duquesne Way, Pittsburgh, Pa.

Franklin Institute.....Philadelphia, Pa.

Gas and Oil Power.....3 Oxford Court, Cannon street, London, E. C., England.

Il Direttore, Della Rivista Marittima.....Rome, Italy.
Institution of Civil Engineers.....Great George street, Westminster, London, S. W., England.
Institution of Engineers and Shipbuilders in Scotland, The.....Glasgow, Scotland.
Institution of Mechanical Engineers, The
Storey's Gate, St. James Park, Westminster, S. W., London, England.
Institution of Naval Architects .....5 Adelphi Terrace, London, W. C., England.

Journal of Royal United Service Institution .....Whitehall, London, S. W., England.
Journal of the United States Artillery.....Fort Monroe, Va.

Librarian Smithsonian Institute.....Washington, D. C.
Liga Naval Portuguesa .....95, Rua Garrett, Lisbon, Portugal.
Literary Digest.....44-60 East 23d street, New York, N. Y.

Machinery.....66 West Broadway, New York, N. Y.
Marine Engineering.....Whitehall Building, 17 Battery Place, New York, N. Y.
Marine Journal.....24 State street, New York, N. Y.
Marine Review and Marine Record.....39-41 Wade Building, Cleveland, Ohio.
Metal Industry, The.....61 Beekman street, New York, N. Y.

Naval Institute.....Naval Academy, Annapolis, Md.
Navy, The.....732 13th street, N. W., Washington, D. C.
Northeast Coast Institution of Engineers and Shipbuilders,
4 St. Nicholas' Buildings, West, Newcastle-upon-Tyne, England.

Page's Weekly, Editorial Department,
Clun House, Surry street, Strand, London, W. C., England.
Popular Mechanics.....Journal Building, Chicago, Ill.
" Power,".....World Building, New York, N. Y.

Quarterly Digest of Physical Tests.....1424 N. 9th street, Philadelphia, Pa.
Questions Navales.....200 Rue de Rivoli, Paris, France.

Scientific American.....361 Broadway, New York, N. Y.
Schiffbautechnischen Gesellschaft.....Schumanstrasse 2 pr., Berlin, N. W., Germany.
Sibley Journal of Engineering.....Cornell University, Ithaca, N. Y.
Société des Ingenieurs Civils.....19 Rue Blanche, Paris, France.
Steamship, The.....2 Custom House Chambers, Leith, Scotland.
Stevens Indicator.....Stevens Institute, Hoboken, N. J.

Technology Quarterly.....Massachusetts Institute of Technology, Boston, Mass.
Technical World, The Editor.....3321 Armour avenue, Chicago, Illinois.
The Practical Engineer.....359 Strand, London, W. C., England.
Tidskrift for Sövesen.....Horten, Norway.

Western Builder, The.....607-8 Montgomery Building, Milwaukee, Wis.
Western Society of Associated Engineers.....Quincy, Ill.
Western Society of Engineers.....1737 Monadnock Block, Chicago, Ills.
Wisconsin Engineer.....Library of the University of Wisconsin, Madison, Wis.

Yacht, Le.....55 Rue de Chateaudun, Paris, France.
Yale Scientific Monthly.....New Haven, Conn.

Zeitschrift Vereines Deutscher Ingenieure.....Charlotten strasse, 43, Berlin.